

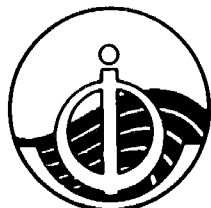
Intergovernmental Oceanographic Commission
Reports of Meetings of Experts and Equivalent Bodies

**UNEP-IOC-ASPEI Global Task
Team on the Implications of
Climate Change on Coral Reefs**

First Meeting

Guam, 27-28 June 1992

UNESCO



UNEP-IOC-ASPEI Global Task Team on the Implications of Climate Change on Coral Reefs

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In this Series, entitled

Reports of Meetings of Experts and Equivalent Bodies, which was initiated in 1984 and which is published in English only, unless otherwise specified, the reports of the following meetings have already been issued:

1. Third Meeting of the Central Editorial Board for the Geological/Geophysical Atlases of the Atlantic and Pacific Oceans
2. Fourth Meeting of the Central Editorial Board for the Geological/Geophysical Atlases of the Atlantic and Pacific Oceans
3. Fourth Session of the Joint IOC-WMO-CPPS Working Group on the Investigations of 'El Niño' (*Also printed in Spanish*)
4. First Session of the IOC-FAO Guiding Group of Experts on the Programme of Ocean Science in Relation to Living Resources
5. First Session of the IOC-UN(OETB) Guiding Group of Experts on the Programme of Ocean Science in Relation to Non-Living Resources
6. First Session of the Editorial Board for the International Bathymetric Chart of the Mediterranean and Overlay Sheets
7. First Session of the Joint CCOP(SOPAC)-IOC Working Group on South Pacific Tectonics and Resources
8. First Session of the IODE Group of Experts on Marine Information Management
9. Tenth Session of the Joint CCOP-IOC Working Group on Post-IDOE Studies in East Asian Tectonics and Resources
10. Sixth Session of the IOC-UNEP Group of Experts on Methods, Standards and Intercalibration
11. First Session of the IOC Consultative Group on Ocean Mapping (*Also printed in French and Spanish*)
12. Joint IOC-WMO Meeting for Implementation of IGOSS XBT Ships-of-Opportunity Programmes
13. Second Session of the Joint CCOP/SOPAC-IOC Working Group on South Pacific Tectonics and Resources
14. Third Session of the Group of Experts on Format Development
15. Eleventh Session of the Joint CCOP-IOC Working Group on Post-IDOE Studies of South-East Asian Tectonics and Resources
16. Second Session of the IOC Editorial Board for the International Bathymetric Chart of the Mediterranean and Overlay Sheets
17. Seventh Session of the IOC-UNEP Group of Experts on Methods, Standards and Intercalibration
18. Second Session of the IOC Group of Experts on Effects of Pollutants
19. Primera Reunión del Comité Editorial de la COI para la Carta Batimétrica Internacional del Mar Caribe y Parte del Océano Pacífico frente a Centroamérica (*Spanish only*)
20. Third Session of the Joint CCOP/SOPAC-IOC Working Group on South Pacific Tectonics and Resources
21. Twelfth Session of the Joint CCOP-IOC Working Group on Post-IDOE Studies of South-East Asian Tectonics and Resources
22. Second Session of the IODE Group of Experts on Marine Information Management
23. First Session of the IOC Group of Experts on Marine Geology and Geophysics in the Western Pacific
24. Second Session of the IOC-UN(OETB) Guiding Group of Experts on the Programme of Ocean Science in Relation to Non-Living Resources (*Also printed in French and Spanish*)
25. Third Session of the IOC Group of Experts on Effects of Pollutants
26. Eighth Session of the IOC-UNEP Group of Experts on Methods, Standards and Intercalibration
27. Eleventh Session of the Joint IOC-IHO Guiding Committee for the General Bathymetric Chart of the Oceans (*Also printed in French*)
28. Second Session of the IOC-FAO Guiding Group of Experts on the Programme of Ocean Science in Relation to Living Resources
29. First Session of the IOC-IAEA-UNEP Group of Experts on Standards and Reference Materials
30. First Session of the IOC-CARIBE Group of Experts on Recruitment in Tropical Coastal Demersal Communities (*Also printed in Spanish*)
31. Second IOC-WMO Meeting for Implementation of IGOSS XBT Ship-of-Opportunity Programmes
32. Thirteenth Session of the Joint CCOP-IOC Working Group on Post-IDOE Studies of East Asia Tectonics and Resources
33. Second Session of the IOC Task Team on the Global Sea-Level Observing System
34. Third Session of the IOC Editorial Board for the International Bathymetric Chart of the Mediterranean and Overlay Sheets
35. Fourth Session of the IOC-UNEP-IMO Group of Experts on Effects of Pollutants
36. First Consultative Meeting on RNODCs and Climate Data Services
37. Second Joint IOC-WMO Meeting of Experts on IGOSS-IODE Data Flow
38. Fourth Session of the Joint CCOP/SOPAC-IOC Working Group on South Pacific Tectonics and Resources
39. Fourth Session of the IODE Group of Experts on Technical Aspects of Data Exchange
40. Fourteenth Session of the Joint CCOP-IOC Working Group on Post-IDOE Studies of East Asian Tectonics and Resources
41. Third Session of the IOC Consultative Group on Ocean Mapping
42. Sixth Session of the Joint IOC-WMO-CPPS Working Group on the Investigations of 'El Niño' (*Also printed in Spanish*)
43. First Session of the IOC Editorial Board for the International Bathymetric Chart of the Western Indian Ocean
44. Third Session of the IOC-UN(OALOS) Guiding Group of Experts on the Programme of Ocean Science in Relation to Non-Living Resources
45. Ninth Session of the IOC-UNEP Group of Experts on Methods, Standards and Intercalibration
46. Second Session of the IOC Editorial Board for the International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico
47. First Session of the IOC Editorial Board for the International Bathymetric Chart of the Western Indian Ocean
48. Twelfth Session of the Joint IOC-IHO Guiding Committee for the General Bathymetric Chart of the Oceans
49. Fifteenth Session of the Joint CCOP-IOC Working Group on Post-IDOE Studies of East Asian Tectonics and Resources
50. Third Joint IOC-WMO Meeting for Implementation of IGOSS XBT Ship-of-Opportunity Programmes
51. First Session of the IOC Group of Experts on the Global Sea-Level Observing System
52. Fourth Session of the IOC Editorial Board for the International Bathymetric Chart of the Mediterranean
53. First Session of the IOC Editorial Board for the International Chart of the Central Eastern Atlantic (*Also printed in French*)
54. Third Session of the IOC Editorial Board for the International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico (*Also printed in Spanish*)
55. Fifth Session of the IOC-UNEP-IMO Group of Experts on Effects of Pollutants
56. Second Session of the IOC Editorial Board for the International Bathymetric Chart of the Western Indian Ocean
57. First Meeting of the IOC *ad hoc* Group of Experts on Ocean Mapping in the WESTPAC Area
58. Fourth Session of the IOC Consultative Group on Ocean Mapping
59. Second Session of the IOC-WMO/IGOSS Group of Experts on Operations and Technical Applications
60. Second Session of the IOC Group of Experts on the Global Sea-Level Observing System
61. UNEP-IOC-WMO Meeting of Experts on Long-Term Global Monitoring System of Coastal and Near-Shore Phenomena Related to Climate Change
62. Third Session of the IOC-FAO Group of Experts on the Programme of Ocean Science in Relation to Living Resources
63. Second Session of the IOC-IAEA-UNEP Group of Experts on Standards and Reference Materials
64. Joint Meeting of the Group of Experts on Pollutants and the Group of Experts on Methods, Standards and Intercalibration
65. First Meeting of the Working Group on Oceanographic Co-operation in the ROPME Sea Area
66. Fifth Session of the Editorial Board for the International Bathymetric and its Geological/Geophysical Series
67. Thirteenth Session of the IOC-IHO Joint Guiding Committee for the General Bathymetric Chart of the Oceans (*Also printed in French*)
68. International Meeting of Scientific and Technical Experts on Climate Change and Oceans
69. UNEP-IOC-WMO-IUCN Meeting of Experts on a Long-Term Global Monitoring System
70. Fourth Joint IOC-WMO Meeting for Implementation of IGOSS XBT Ship-of-Opportunity Programmes
71. ROPME-IOC Meeting of the Steering Committee on Oceanographic Co-operation in the ROPME Sea Area
72. Seventh Session of the Joint IOC-WMO-CPPS Working Group on the Investigations of 'El Niño' (*Spanish only*)
73. Fourth Session of the IOC Editorial Board for the International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico (*Also printed in Spanish*)
74. UNEP-IOC-ASPEI Global Task Team on the Implications of Climate Change on Coral Reefs

UNEP-IOC-ASPEI/GTTTCR-1/3
Paris, 29 July 1992
English only

SC-92/WS-38

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1. OPENING OF THE MEETING

1 The meeting was opened at 9.00 am on 27 June 1992 by Dr. Makram Gerges, Deputy Director of the Oceans and Coastal Areas Programme Activity Centre of UNEP, on behalf of the co-sponsoring organizations. He briefly explained that the meeting was jointly organized by UNEP, IOC and ASPEI and welcomed the participants to the first meeting of the Global Task Team on the Implications of Climate Change on Coral Reefs.

2 In stressing the importance which UNEP attaches to the work of the Regional and Global Task Teams on the implications of climate change, Dr. Gerges indicated that the outcome of this meeting which will be in the form of an authoritative scientific and technical review of the implications of climate change for coral reefs and their ecologically sustainable use, will constitute an essential input into our understanding of the environmental problems likely to be associated with climate change. He further pointed out that the present Task Team will be expected to provide expert advice and guidance in the implementation of the pilot activity on coral reef monitoring as part of the UNEP-IOC-WMO Long-Term Global Monitoring System of coastal and near-shore phenomena related to climate change. This would ensure co-ordination of various activities aimed at assessing the scale of impacts on natural environments and socio-economic systems particularly in the case of low-lying islands and other areas vulnerable to climate change and sea level rise. The work of the Task Team should ultimately assist the Governments concerned in mitigating the impacts of such changes.

3 Dr. John Pernetta, Representative of the IOC, welcomed participants on behalf of the Secretary of IOC, Dr. Gunnar Kullenberg and expressed the support of the IOC for the work of the Task Team and the importance which IOC attaches to that work. As the designated focal point within the joint Secretariat for the development of the UNEP-IOC-WMO-IUCN pilot activity on coral reef monitoring, the IOC looks forward to the results of this meeting in providing guidance on the further development and implementation of this component of the Long-Term Global Monitoring System.

4 Dr. Harley Manner, Chairman of the Association of South Pacific Environmental Institutions (ASPEI) welcomed participants to Guam and to the University of Guam on behalf of the President of the University. He further indicated the willingness of ASPEI to support the work of the Task Team.

2. ADMINISTRATIVE ARRANGEMENTS

2.1 ELECTION OF THE MEETING CHAIRMAN & RAPPORTEUR

5 It was proposed by the Representative of UNEP and approved by the meeting that Dr. Clive Wilkinson serve as Chairman and Dr. J. Pernetta as Rapporteur for the meeting. The Representatives of UNEP, IOC and ASPEI formed the joint technical secretariat for the meeting.

2.2 ADOPTION OF THE AGENDA

6 The provisional agenda as proposed by the Secretariat, was adopted and appears as Annex I to this report.

2.3 CONDUCT OF THE MEETING

7 The Secretariat reviewed the list of documentation made available to the meeting and listed in Annex II of this report. They further outlined the proposed timetable and working hours. These arrangements were agreed by the meeting. The meeting was conducted in English and was convened in plenary.

3. BRIEF PRESENTATION BY EACH TASK TEAM MEMBER OF THEIR FIELD OF EXPERTISE RELEVANT TO THE IMPLICATIONS OF CLIMATE CHANGE ON CORAL REEFS

8 Under this agenda item, members of the Task Team briefly introduced themselves and outlined their areas of speciality and interest relevant to the work of the Task Team. The full list of participants appears as Annex III to this report.

4. SUMMARY AND REVIEW OF THE UNEP, IOC AND ASPEI PROGRAMMES AND ACTIVITIES ON CLIMATE CHANGE IMPACTS

9 The Representative of UNEP introduced Document UNEP-IOC/GTTCR-I/Inf.2 on the status and development of climate impact studies supported by UNEP's Oceans and Coastal Areas Programme Activity Centre, at both the regional and global levels, outlining the approaches followed, the progress achieved and the planned activities thereof.

10 The Representative of IOC briefed the meeting concerning the relevant activities of IOC in the area of climate change impact assessment including developments resulting from the 1990 Expert meeting in Paris on a Long-Term Global Monitoring System of Coastal and Near-Shore Phenomena Related to Climate Change (UNEP-IOC-WMO/GCNSMS-I/3). He presented a brief overview of the Global Ocean Observing System (GOOS) initiated by IOC in co-operation with WMO and UNEP. This system is to be developed according to a globally coordinated, scientifically based strategy and the coastal component of this system is designed to identify, understand and analyze the responses of coastal and near-shore ocean processes and systems to climate forcing.

11 The Chairman of ASPEI introduced Document UNEP-IOC/GTTCR-I/Inf.3 and briefed the meeting on the involvement of ASPEI in climate change impact studies and inter-regional activities. He reviewed the work of the ASPEI-UNEP-SPREP South Pacific Regional Task Team on the implications of climate change and sea level rise on the countries of the SPREP Region and the involvement of ASPEI in originating the proposal for the formation of two Global Task Teams to evaluate the implications of climate change for mangroves and for coral reefs respectively. He expressed his organization's satisfaction that this initiative had become a reality through the convening of the present meeting.

5. TERMS OF REFERENCE FOR THE TASK TEAM

12 The Representative of UNEP introduced the draft terms of reference for the Task Team prepared by the joint secretariat in advance of the meeting. The major objectives included the preparation of an overview of the impacts of climate change on coral reefs and their ecologically sustainable use; and the identification of suitable case study sites for follow-up activities which might be initiated by the sponsoring agencies subsequent to the completion of the overview. He stressed that members had been invited to serve on a voluntary basis and in their personal capacity and were not representing organizations or institutions at the meeting. In selecting the members, the joint Secretariat had attempted to ensure a broad geographic representation in combination with a reasonable spread of expertise to cover the major areas of concern to the work of the Task Team.

13 Following extensive discussion the Terms of Reference as proposed by the joint Secretariat were approved with minor amendment. The agreed Terms of Reference under which the Task Team would conduct its future work are contained in Annex IV to this report.

6. BACKGROUND TO THE PREPARATION OF THE GLOBAL REVIEW OF CLIMATE CHANGE IMPACTS ON CORAL REEFS

6.1 DISCUSSION OF THE PHYSICAL IMPACTS (INCLUDING CLIMATE, GEOLOGY, CHEMISTRY)

14 Dr. Robert W. Buddemeier led the discussion under this item by outlining: (i) the inter-relationship between various physical parameters; (ii) the way in which these would change under future scenarios of climate; and (iii) the potential consequences of such changes for coral reef ecosystems. The importance of various feedback loops between different variables and the need for inclusion of an historical evaluation of reefs under various climatic regimes in the geologic past was discussed.

15 Dr. R.W. Buddemeier outlined some concerns which he had regarding the scale of the task at hand and its potential magnitude, depending upon the extent to which the various potential impacts were evaluated at a regional, sub-regional or smaller scale. The meeting agreed that the purpose was to

prepare a global overview and that too detailed a regional approach would be difficult without extensive investment of time and resources. Furthermore, it was recognized that several up-to-date authoritative reviews of this aspect of the problem were already available and that these should form the basis for the relevant portion of the overview.

6.2 DISCUSSION OF THE BIOLOGICAL IMPACTS (INCLUDING BLEACHING, CORAL SYMBIOSIS, COMMUNITY STRUCTURE, GROWTH RATE, PRODUCTIVITY)

16 Dr. Helen Yap led the discussion under this item by pointing out that any consideration of the impacts of climate change on reef ecosystems inevitably involved a consideration of the potential responses of reefs to each forcing function both independently and in combination. In some instances it was not only impossible at the present time to assess the magnitude of the response, but also impossible to be certain about the direction of a synergistic response (positive or negative).

17 Dr. H. Yap further suggested that coral reef biological responses could be examined at an organism, a population or an ecosystem level and that a detailed overview which covered all levels of potential response might be too large a task for the Team to accomplish in a reasonable time frame.

18 A lengthy discussion ensued during which the possibility of examining system responses to climate forcing by means of various matrices including combinations of: (i) forcing functions and responses; (ii) forcing functions and spatial pattern; and (iii) others were discussed *in extenso*. It was clear to members that although the review should be a sound scientific review it would not be possible to outline the detailed scientific arguments which formed the underpinning to the assessment and that the report would necessarily be supported by an extensive bibliography.

6.3 DISCUSSION OF THE SOCIO-ECONOMIC IMPACTS (INCLUDING FISHERIES, TOURISM, NON-LIVING RESOURCES, IMPACTS ON COASTAL PROTECTION, LEGAL, REGIONAL AND INTERNATIONAL ISSUES)

19 Dr. J. Pernetta led the discussion under this item by suggesting that a consideration of the socio-economic impacts of changes to reef systems as a consequence of climate change would need to encompass a consideration of the different uses to which societies put both reefs and reef resources and the functions of coral reef systems which have economic value such as protection of coastal areas and shorelines. Changes in the economic value of such uses and functions would need to be quantified in order to evaluate the impacts for different societies.

20 He further pointed out that it might be worthwhile during the course of the review to consider three classes of state or country: (i) those such as atoll states, for which reefs form the sole basis for the economic and physical existence of the country; (ii) those such as small archipelagic states, for which coral reefs form a significant and major component of the subsistence and commercial economies; and (iii) those coastal countries for which reefs formed only one of a more diverse set of natural systems on which economic activities and sustainable development opportunities might be based.

21 During discussion it became obvious that without a reasonably clear statement of the biological changes which might occur in reef systems under future climatic regimes any assessment of the scale and magnitude of economic impacts would be extremely difficult if not impossible.

22 It was agreed that the overview should be of moderate length and that the target audience was the political decision makers and their scientific and technical advisers. It was suggested that the Executive Summary should be aimed at the former and that the body of the document should meet the requirements of the latter through the presentation of an authoritative, accurate, up-to-date review of the potential impacts of global changes on coral reefs, relevant to their ecologically sustainable use.

23 It was noted during these discussions that the membership of the Task Team might require some expansion to include additional experts covering the physical and socio-economic fields.

7. PREPARATION OF THE GLOBAL OVERVIEW OF THE IMPACTS OF EXPECTED CLIMATE CHANGE AND SEA LEVEL RISE ON CORAL REEFS

7.1 PREPARATION OF A DRAFT OUTLINE FOR THE OVERVIEW

24 Several Task Team members presented proposed outlines for the contents of the report and considerable areas of similarity were seen in the various presentations. The final agreed draft outline was prepared and is attached as Annex V to this report. The meeting recognized that as the document took shape the final form of the overview might be subject to some modification.

7.2 WORKPLAN AND TIMETABLE INCLUDING INDIVIDUAL MEMBERS RESPONSIBILITIES

25 Following round table discussions on individual members potential contributions to the preparation of the draft report a workplan and timetable were drafted and approved by the meeting. This is attached as Annex VI to this report.

26 It was agreed that individual Task Team members would contribute information and short written pieces to a small core group responsible for the integration of submissions and production of the final integrated document. The agreed members of this core editorial group are: Dr. C. Wilkinson, Dr. R.W. Buddemeier, and Dr. H. Manner. The entire Task Team would be expected to provide peer review of the document in advance of the second meeting of the Task Team.

8. UNEP-IOC-WMO-IUCN LONG-TERM GLOBAL MONITORING SYSTEM OF COASTAL AND NEAR-SHORE PHENOMENA RELATED TO CLIMATE CHANGE: PILOT PHASE ACTIVITY ON CORAL REEFS

27 The Representative of the IOC presented Document UNEP-IOC-WMO-IUCN/GCNSMS-II/3 and outlined the stages of development which had led to the formulation of the pilot phase activity to monitor the impacts of climate change on coral reefs. He further indicated that the IOC as the implementing agency on behalf of the co-sponsoring agencies looked to the Task Team for scientific and technical advice concerning the implementation of the proposed coral reef monitoring pilot phase activity which formed one of six initial pilot phase activities.

28 Dr. Pernetta further informed the meeting of the successful outcome of the workshop held on Thursday afternoon 25 June 1992 in conjunction with the 7th International Coral Reef Symposium. This workshop had decided that a global co-ordinated network of monitoring stations was indeed necessary; and those present had agreed to co-ordinate existing and planned regional and other activities and to co-operate within the framework of the UNEP-IOC-WMO-IUCN proposed pilot activity on coral reef of the long-term global monitoring system of coastal and near-shore phenomena related to climate change. During the workshop numerous individuals and institutions had expressed their intention to participate in the pilot phase.

29 Comments from the Task Team on the proposal were solicited and the Global Task Team supported the need for co-ordinated monitoring and welcomed the initiative of the joint secretariat in developing the proposal.

9. THE POTENTIAL ROLE OF THE GLOBAL TASK TEAM AS A SCIENTIFIC AND TECHNICAL ADVISORY BODY TO UNEP AND IOC REGARDING THE IMPLEMENTATION OF THIS PILOT PHASE ACTIVITY

30 Under this agenda item the Task Team was invited to consider its potential role in contributing to the further development of this pilot phase activity to monitor climate change impacts on coral reefs. The Task Team unanimously agreed that it contained within its membership much of the expertise and geographic spread necessary to undertake this role. The Task Team further agreed to accept this responsibility, within the limits of the constraints set by time and resources.

10. **ELECTION OF THE TASK TEAM CO-ORDINATOR**

31 The meeting unanimously elected Dr. C. Wilkinson as Co-ordinator of this Global Task Team, and recommended his appointment to UNEP. Dr. Wilkinson agreed to accept this nomination subject to the acceptance by his institution of a time commitment not in excess of 20 working days per calendar year.

11. **ADOPTION OF THE REPORT OF THE MEETING**

32 The draft report of the meeting was presented and adopted as it appears in this document.

12. **CLOSURE OF THE MEETING**

33 On behalf of the joint Secretariat, the Representative of UNEP, Dr. M. Gerges expressed his thanks and appreciation to the members of the Task Team for their keen interest in the work of the Task Team and for the high spirit of understanding and co-operation which prevailed during the meeting and led to its success. He gratefully acknowledged the assistance and hospitality extended to the Task team by the University of Guam and their Marine Laboratory in providing facilities and services to the meeting.

34 The meeting was closed by the Chairman at 17:45 on 28 June 1992.

ANNEX I

AGENDA

1. OPENING OF THE MEETING BY THE UNEP, IOC, ASPEI REPRESENTATIVES
2. ADMINISTRATIVE ARRANGEMENTS
 - 2.1 ELECTION OF THE MEETING CHAIRMAN AND RAPPORTEUR
 - 2.2 ADOPTION OF THE AGENDA
 - 2.3 CONDUCT OF THE MEETING
3. BRIEF PRESENTATION BY EACH TASK TEAM MEMBER OF THEIR FIELD OF EXPERTISE RELEVANT TO THE IMPLICATIONS OF CLIMATE CHANGE ON CORAL REEFS
4. SUMMARY AND REVIEW OF THE UNEP, IOC AND ASPEI PROGRAMMES AND ACTIVITIES ON CLIMATE CHANGE IMPACTS
5. TERMS OF REFERENCE FOR THE TASK TEAM
6. BACKGROUND TO THE PREPARATION OF THE GLOBAL REVIEW OF CLIMATE CHANGE IMPACTS ON CORAL REEFS
 - 6.1 DISCUSSION OF PHYSICAL IMPACTS (INCLUDING CLIMATE, GEOLOGY, CHEMISTRY)
 - 6.2 DISCUSSION OF BIOLOGICAL IMPACTS (INCLUDING BLEACHING, CORAL SYMBIOSIS, COMMUNITY STRUCTURE, GROWTH RATE, PRODUCTIVITY)
 - 6.3 DISCUSSION OF SOCIO-ECONOMIC IMPACTS (INCLUDING FISHERIES, TOURISM, NON-LIVING RESOURCES, IMPACTS ON COASTAL PROTECTION, LEGAL, REGIONAL AND INTERNATIONAL ISSUES)
7. PREPARATION OF THE GLOBAL OVERVIEW OF THE IMPACTS OF EXPECTED CLIMATE CHANGE AND SEA LEVEL RISE ON CORAL REEFS
 - 7.1 PREPARATION OF A DRAFT OUTLINE FOR THE OVERVIEW
 - 7.2 WORKPLAN AND TIMETABLE INCLUDING INDIVIDUAL MEMBERS RESPONSIBILITIES
8. UNEP-IOC-WMO-IUCN LONG-TERM GLOBAL MONITORING SYSTEM OF COASTAL AND NEAR-SHORE PHENOMENA RELATED TO CLIMATE CHANGE: PILOT PHASE ACTIVITY ON CORAL REEFS
9. THE POTENTIAL ROLE OF THE GLOBAL TASK TEAM AS A SCIENTIFIC AND TECHNICAL ADVISORY BODY TO UNEP AND IOC REGARDING THE IMPLEMENTATION OF THIS PILOT PHASE ACTIVITY
10. ELECTION OF THE TASK TEAM CO-ORDINATOR
11. ADOPTION OF THE REPORT OF THE MEETING
12. CLOSURE OF THE MEETING

ANNEX II

LIST OF DOCUMENTS¹

Document Code	Title
WORKING DOCUMENTS	
UNEP-IOC-ASPEI/GTTCR-I/1	Agenda
UNEP-IOC-ASPEI/GTTCR-I/1 Add.	Timetable
UNEP-IOC-ASPEI/GTTCR-I/2	Annotated Provisional Agenda
UNEP-IOC-ASPEI/GTTCR-I/3	Summary Report
UNEP-IOC-ASPEI/GTTCR-I/4	List of Documents
UNEP-IOC-ASPEI/GTTCR-I/5	List of Participants
UNEP-IOC-ASPEI/GTTCR-I/6	Terms of Reference
INFORMATION/REFERENCE DOCUMENTS	
UNEP-IOC-WMO/GCNSMS-I/3	UNEP-IOC-WMO Meeting of Experts on a Long-Term Global Monitoring System of Coastal and Near-Shore Phenomena Related to Climate Change, Paris, 10-14 December 1990.
UNEP-IOC-WMO-IUCN/GCNSMS-II/3	UNEP-IOC-WMO-IUCN Meeting of Experts on a Long-Term Global Monitoring System of Coastal and Near-Shore Phenomena Related to Climate Change: Pilot Projects on Mangroves and Coral Reefs, Monaco, 9-13 December 1991.
UNEP-IOC-ASPEI/GTTCR-I/Inf.1	Draft Manual of Methods.
UNEP-IOC-ASPEI/GTTCR-I/Inf.2	Information note on: The status and development of climate impact studies supported by UNEP's Oceans and Coastal Areas Programme Activity Centre. UNEP. 10 June 1992.
UNEP-IOC-ASPEI/GTTCR-I/Inf.3	Background to ASPEI and its' climate change activities.
UNEP-IOC-ASPEI/GTTCR-I/Inf.4	Smith, S.V. & R.W. Buddemeier. 1992 Global Change and Coral Reef ecosystems. Ann. Rev. Ecol. Syst. 23:89-118.
UNEP-IOC-ASPEI/GTTCR-I/Inf.5	Salvat, B. 1992. Coral Reefs - a challenging ecosystem for human societies. Global Environ. Change 2(1):12-18.
UNEP-IOC-ASPEI/GTTCR-I/Inf.6	Wigley, T.M.L. & S.C.B. Raper. 1992 Implications for climate and sea level of the revised IPCC emissions scenarios. Nature 357:293-230.
UNEP-IOC-ASPEI/GTTCR-I/Inf.7	Pernetta, J.C. & D.L. Elder. 1992. Climate, Sea Level Rise and the Coastal Zone: Management and Planning for Global Changes. Ocean & Coastal Management 18:113-160.
UNEP-IOC-ASPEI/GTTCR-I/Inf.8	Vicente, V.C. 1992. Expected response of Caribbean Coral Reefs to disturbances associated with sea level rise. Paper presented to the IPCC Workshop. The Rising Challenge of the Sea. Margarita Island, Venezuela, March 9-13 1992.

This list is for reference only. No stocks of these documents are maintained, except for the Summary Report.

ANNEX III

LIST OF PARTICIPANTS

I. MEMBERS OF THE TASK TEAM

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ANNEX IV

TERMS OF REFERENCE OF THE TASK TEAM

1. The Task Team is to be established and to work under the overall co-ordination and guidance of the Oceans and Coastal Areas Programme Activity Centre (OCA/PAC) of UNEP and the Intergovernmental Oceanographic Commission (IOC) of UNESCO.
2. The Task Team will operate under the direct guidance of a Task Team Co-ordinator selected from amongst the members of the Task Team who will be appointed by OCA/PAC in consultation with IOC.
3. Task team members will serve in their individual capacity and on a voluntary basis.
4. In selection of Task Team members, the need for adequate geographic representation and expertise relevant to the work of the Task Team is to be taken into account.
5. UNEP's financial support to the Task Team will be provided through the IOC.
6. The objectives of the Task Team are:
 - a) to prepare a global overview on the potential impacts of climate change and sea level rise on coral reefs and the implications of such impacts for future ecologically sustainable use of coral reefs. The overview will be submitted to UNEP and IOC for publication and will be based on the best available existing knowledge and insight into the problems relevant to its subject.
 - b) to identify selected case study sites using the best available knowledge on coral reefs for specific sites.
7. The Task Team will act as an expert advisory body to both UNEP and IOC with regard to:
 - a) the scientific and technical aspects of the planning and implementation of the UNEP-IOC-WMO-IUCN pilot phase activity on coral reefs, as a part of the Global Monitoring System of Coastal and Near-Shore Phenomena Related to Climate Change;
 - b) training and assistance programmes required for the implementation of the pilot phase activity on coral reef ecosystems and follow-up activities; and,
 - c) interaction with the activities of UNEP and IOC regional programmes and bodies, as well as with other relevant activities of the IPCC, IUCN etc.
8. The ultimate objective of the Task Team is to assist governments in the identification and implementation of suitable policy options to mitigate the negative consequences of the impacts on coral reefs and the associated socio-economic structures.

ANNEX V

THE IMPLICATIONS OF CLIMATE CHANGE FOR SUSTAINABLE USE OF CORAL REEFS
OUTLINE OF THE DRAFT REPORT

1. INTRODUCTION: CORAL REEFS CLIMATE AND PEOPLE

1.1 WHAT IS A CORAL REEF?

Physical - geological structure
Biological - communities
Human use - dependence and use

1.2 CORAL REEF INTERACTIONS WITH THE ENVIRONMENT

Marine environment
Atmospheric Environment
Climate and Environment

1.3 HUMAN USE OF REEFS

Dependence and use

1.4 CLIMATE CHANGE

Past variations
Recent trends
predictions for the future - IPCC guidelines

2. WHAT IS HAPPENING TO CORAL REEFS ?

2.1 NATURAL VARIABILITY

Space - Structure
Time - Status

2.2 STRESSES ON REEFS

Anthropogenic
Natural
Climate Change

3. WHAT IS HAPPENING TO CLIMATE?

What is climate ?
Natural variability
Global change - what is it/causes
What components of climate are changing?
What else is changing and how do they interact ?

4. HOW WILL CLIMATE CHANGE AFFECT REEFS ?

4.1 GENERAL

Temperature
Sea level rise
Carbon dioxide
Episodic events
Hydrologic changes

4.2 EFFECTS ON DIFFERENT TYPES OF REEFS

4.3 EFFECTS ON REEFS IN DIFFERENT CONDITIONS

5. SOCIO-ECONOMIC ISSUES AND CLIMATE CHANGE ?

5.1 LIVING RESOURCE EXTRACTION

Fishing - subsistence & commercial

5.2 NON-LIVING RESOURCES

Building materials - engineering

Tourism

Biodiversity and potential resources

Aesthetics

Functions - shore protection

6. MANAGEMENT AND POLICY IMPLICATIONS

What should be done by governments - high medium and low dependence

Risks of inaction and action

ANNEX VI

WORKPLAN AND TIMETABLE

INDIVIDUAL TASK TEAM MEMBERS RESPONSIBILITIES AND CONTRIBUTIONS TO THE DRAFT OVERVIEW:

A three person committee will compile the various drafts of the overview, namely: Dr. C. Wilkinson (Co-ordinator), Dr. R. W. Buddemeier & Dr H. Manner.

Drafts will be based on inputs from Task Team members as follows:

Physical	- R. Buddemeier - J. Jaubert - J. Baker
Biological Ecology	- C. Birkeland - V. Vicente - M. Fouda - J. Ogden
Metabolic	- H. Yap - J. Jaubert
Status & stresses	- C. Wilkinson - J. Ogden
Socio-economic	- H. Manner - B. Salvat - M. Ali - J. Pernetta
Management and Policy	- J. Baker
Regional Atlantic	- V. Vicente - J. Ogden
East Pacific	- B. Salvat
West Pacific	- C. Birkeland - H. Yap - C. Wilkinson
Indian Ocean	- M. Ali - M. Fouda

TIMETABLE

Compilation of concept summary and despatch to Task Team members and joint secretariat	no later than end July 1992
Inputs from Task Team to co-ordinators	no later than end October 1992
Complete 1st draft and distribute to Task Team members and joint Secretariat	no later than early February 1993
Receipt of comments by Co-ordinator	mid April 1993
Finalization of draft and despatch to Task Team members and joint Secretariat	no later than end April 1993
2nd Task Team meeting	last week of May 1993